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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/913,905	01/23/2002	Colin Ramshaw	A01205US	7363

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EXAMINER

BHAT, NINA NMN

ART UNIT	PAPER NUMBER
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1764

DATE MAILED: 11/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/913,905

Applicant(s)

RAMSHAW ET AL.

Examiner

N. Bhat

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☒ Claim(s) 11-13 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 November 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2-17-04, 1-29-02
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

1. The examiner acknowledges receipt of applicant's petition to correct the inventorship and the new oath. The examiner would like to inform applicant that the changes have not taken place in PALM/PAIR i.e., the bibliographic data only includes 2 inventors. Applicant is requested to ensure that the PTO has indeed corrected these changes in the next correspondence.
2. The disclosure is objected to because of the following informalities:
Applicant is required to include the heading "Brief Description of the Drawings on Page 15, line 10. Appropriate correction is required.
3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.
4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:
 1. Determining the scope and contents of the prior art.
 2. Ascertaining the differences between the prior art and the claims at issue.
 3. Resolving the level of ordinary skill in the pertinent art.
 4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
5. Claims 1-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Porter et al. USP 4,549,998 or GB 2 108 407 taken with Hayashi et al.

Porter et al. teach a reactor apparatus or centrifugal device for contacting a liquid with a gas or with a second liquid by carrying out the gas-liquid contact or liquid-liquid contact on a rotating plate whose surface is capable of creating perturbations in the liquid flowing across it to provide intimate mixing or shear mixing to promote reaction. Specifically, if one or more plates are mounted transversely to the axis the use of one or more plates which is or are capable of creating perturbations in the film of liquid flow there over gives an improvement in mass transfer between the first liquid and second liquid or gas. The plate surface is capable of creating perturbations in the liquid flow across it and the plate can include a protrusion from the surface, maybe corrugated, porous or perforated or include indentations. The plate is specifically designed to create perturbations while the liquid film flows along the spinning plate. The plate can also be a foraminated, crib form or can be gauze or mesh like and are disposed symmetrically about the axis of rotation of the rotor. The plates can be made of metal or plastic and can be made for a woven, knitted or non-woven fabric. [Note Column 1, lines 15-67 and Column 2, lines 9-50]

GB 2180407 teaches a reactor for the continuous production of epoxide resins by the conversion of liquid starting constituents such as epichlorohydrin, phenols or halogenated phenols in the reactor being pressure resistant and having a circular stator (1) and a circular driven rotor (2) having mutually facing surfaces each with intermeshing tooth elements (3) arranged in concentric tooth circles surround the stator having inlets (5,6) and an outlet (7). The toothed structure provides shear mixing and adequate reaction residence time for the reaction to take place while spinning disc

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technology is employed. [Note Page 1 lines 50-100] Specifically, GB 2180407, teach an epoxide polymerization reaction which employs spinning disc technology which includes a reactor apparatus including a support element rotatable about its axis, the support element having a surface with a periphery and feed mechanism to supply reactant to the surface the reaction flows across the surface as a thin film. GB 2180407 teaches that in carrying out the epoxide resin reaction, the reaction mixture flows under pressure through the inlet (5) between the first and second tooth circles of the stator (1) into the reactor and carried along by the rotary movement of the tooth elements (3) of the rotor (4) flung outwards by the centrifugal forces deflected by the tooth elements (3) of the stator and intensively mixed thereby reacting in such a way to completely converted the reactants into epoxides resins. [Note Page 2, lines 48-64]

However, neither Porter et al. nor GB 2 180 407 teach providing a hollow support element adapted to be rotatable about an axis the support having first external reaction surface and second, internal heat transfer surface and means for applying a heat transfer fluid to the second surface.

Hayashi et al. teach a heat exchanger mixer reactor for high viscosity substance, which includes a mixer reactor, which includes an inner casing (1) and outlet (2) inlet (3) for the reaction substances on opposite ends of the casing. An outer casing (4) surrounds the inner casing (3) to form a heat exchanger jacket for the cooling or heating medium. The heat exchange medium enters casing (4) through inlets (5) and (6). The shaft (9), which includes a plurality of, discs (13) and (13') is mounted on the shaft 9 over lapping each other because the diameter of the discs is larger than the central

distance between shafts 9 and 9'. The apparatus can be used in polymerization condensation reactions and specifically uses spinning disc technology. Specifically, the reactant is pumped into casing (1) via inlet (3), mixed and agitated by the discs (13) and fingers (14) which rotate inside the casing (1) and the leaves the casing through outlet (2). Heat transfer is accomplished by either a cooling or heating medium which enters through the inlets (5) and (6) into the jacket between casings 1 and 4, leaving through the discs (7) and (8). The apparatus provides improved heat transfer across the wall while creating a homogeneous and rapid radial mixing action as the reaction substance advances in the axial direction with high volumetric efficiency.

It would have been obvious from the combined teachings of Porter et al. or GB 2108407 taken with Hayashi et al. to provide a reactor using RSORT or spinning disc technology to provide a thin film reaction using a spinning disc this type of reactor is specifically taught in Porter et al. and GB 2108407. As stated above, the concept of using a hollow support element which communicates with the spinning disc or plate has not been taught in either Porter or GB 2108407, the deficiency has been taught by Hayashi et al. who teaches providing a hollow shaft which has heat transfer surfaces which communicates with the spinning disc or plates. Admittedly, the orientation of the discs and the shaft are not the same as claimed by applicant but it is not the orientation which is important, the importance of the Hayashi et al. reference is that it known in the art of spinning disc reactors to provide a hollow shaft which includes heat transfer means so that the discs disposed on the shaft are in heat transfer communication with the discs, the discs can be can include apertures, or can be made of wire mesh or

provided with slits or openings in the manner of a spoked wheel.[Note Porter et al. Column 2, lines 9-50 and Hayashi, Column 2, lines 33-44] To provide the hollow shaft which heat transfer means to communicate with the disc to the reactor as taught in either Porter et al. or GB 2108407 would have been an obvious design choice in light of the teachings of Hyashi et al, thus rendering the invention as a whole obvious to one having ordinary skill in the art at the time the invention was made.

6. Claims 11-13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Cowen et al. '133 teach a spinning disc reactor. Vander Mey et al. teach a thin film reactor. Burns et al. teach a process for forming amido esters utilizing a spinning disc reactor. Cowen et al. '570 teach a spinning disc thin film reactor. Brechtelsbauer et al. teach a process for epoxidizing-substituted cyclohexanones using a spinning disc reactor. Matsubara et al. teach a continuous bulk polymerization reactor. Wilhlem et al. teach a polycondensation method using a rotating disc reactor. Ramshaw et al. teach a rotating surface of revolution reactor with feed and collection mechanisms.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to N. Bhat whose telephone number is 571-272-1397. The examiner can normally be reached on Monday-Friday, 9:30AM-6:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on 571-272-1444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



N. Bhat
Primary Examiner
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